

CLAIMS

What is claimed is:

1. A method of cleaning a structure comprising:
positioning a structure within an at least substantially enclosed treatment vessel;
performing an etching process on a portion of said structure within said treatment vessel;
substantially filling said treatment vessel with a gas inert to said structure and inert to said treatment vessel creating an atmosphere of inert gas inside said treatment vessel;
rinsing said structure with DI water in said atmosphere of inert gas;
submerging said structure in a DI water bath in said treatment vessel having said DI water bath forming a surface with said gas;
forming a continuous layer of a liquid upon said surface of said DI water bath, said continuous layer of said liquid comprising an anhydrous liquid.;
contacting substantially all of said structure with said continuous layer of said liquid; and
entraining said DI water bath below said continuous layer of said liquid.
2. The method of cleaning a structure according to Claim 1, further comprising, prior to rinsing said structure with DI water bath, rinsing said structure in an aqueous HF solution.
3. The method of cleaning a structure according to Claim 1, wherein said etching process includes performing a polysilicon etch on said structure.
4. The method of cleaning a structure according to Claim 1, wherein said gas comprises nitrogen.
5. The method of cleaning a structure according to Claim 1, wherein said continuous layer of said liquid comprises isopropyl alcohol that is supplied to said treatment vessel in a gaseous nitrogen carrier.

6. The method of cleaning a structure according to Claim 1, wherein said contacting substantially all of said structure with said continuous layer of said liquid comprises drawing said structure through said continuous layer of said liquid.

7. The method of cleaning a structure according to Claim 1, wherein contacting substantially all of said structure with said continuous layer of said liquid comprises draining said treatment vessel.

8. The method of cleaning a structure according to Claim 7, wherein said draining said treatment vessel comprises displacing said DI water bath by creating a positive pressure within said treatment vessel with an anhydrous organic liquid in an inert gas carrier, said DI water bath displaced from said treatment vessel through at least one valve.

9. The method of cleaning a structure according to Claim 7, wherein said draining said treatment vessel comprises opening a valve, said DI water bath draining from said treatment vessel by gravity.

10. The method of cleaning a structure according to Claim 1, wherein said treatment vessel comprises a spray/dump rinser.

11. The method of cleaning a structure according to Claim 1, wherein said treatment vessel comprises a cascade rinser.

12. The method of cleaning a structure according to Claim 1, wherein said treatment vessel comprises an overflow rinser.

13. The method of cleaning a structure according to Claim 1, wherein said treatment vessel comprises a Marangoni dryer.

14. A method of cleaning a polysilicon structure comprising:
 selecting a chemical etching process selected from a group consisting of rinsing said structure in an aqueous HF solution, performing an HF dry etch on said structure, and performing a polysilicon etch on said structure;
 performing said chemical etching process upon said structure within an at least substantially enclosed treatment vessel;
 substantially filling said treatment vessel with a gas that is inert to said polysilicon structure and to said treatment vessel;
 providing an inert gas atmosphere inside said treatment vessel;
 rinsing said polysilicon structure with DI water in said inert gas atmosphere;
 submerging said polysilicon structure in a DI water bath in said treatment vessel;
 forming a surface between said DI water bath and said gas;
 forming a liquid layer at said surface formed by said DI water bath surface and gas, said liquid layer including alcohol; and
 separating said polysilicon structure from said DI water bath such that substantially all of said polysilicon structure passes through said liquid layer.

15. The method of cleaning a polysilicon structure according to Claim 14, wherein said gas comprises nitrogen.

16. The method of cleaning a polysilicon structure according to Claim 14, wherein said liquid layer comprises isopropyl alcohol conveyed to said treatment vessel in a nitrogen carrier.

17. The method of cleaning a polysilicon structure according to Claim 14, wherein said separating said semiconductor structure from said DI water bath comprises drawing said polysilicon structure out of said DI water bath.

18. The method of cleaning a polysilicon structure according to Claim 14, wherein said separating said polysilicon structure from said DI water bath comprises draining said treatment vessel.

19. The method of cleaning a polysilicon structure according to Claim 18, wherein said draining said treatment vessel comprises displacing said DI water bath by purging said treatment vessel with an anhydrous organic liquid in an inert gas carrier, said DI water bath displaced from said treatment vessel through at least one valve.

20. The method of cleaning a polysilicon structure according to Claim 18, wherein said draining said treatment vessel comprises opening a valve, said DI water bath draining by gravity.

21. The method of cleaning a polysilicon structure according to Claim 14, wherein said treatment vessel is selected from a group consisting of a spray/dump rinser, a cascade rinser, an overflow rinser, and a Marangoni dryer.

22. A method of cleaning a structure comprising:
performing a chemical reaction wet etching upon said structure within a single compartment of
an at least substantially enclosed vessel;
purging the single compartment of said vessel with a gas;
forming an inert gas atmosphere in the single compartment of said vessel, said gas forming said
inert gas atmosphere being inert to said structure and to said vessel;
contacting said structure with DI water;
removing from said structure chemicals from said chemical reaction wet etching;
maintaining said inert gas atmosphere in the single compartment of said vessel by filling the
single compartment of said vessel using DI water;
submerging said structure in the single compartment of said vessel and contacting said DI water
with said inert gas;

conveying an anhydrous organic vapor in a gas to said vessel, said anhydrous organic vapor selected from a group consisting of acetone, chloroform, methanol, carbon tetrachloride, benzene, ethanol, ethyl acetate, hexane, 1-propanol, and 2-propanol, said anhydrous organic vapor contacting a surface of said DI water to form a layer of said anhydrous organic liquid thereon;
displacing said inert gas atmosphere with said anhydrous organic vapor, said anhydrous organic vapor contacting a surface of said DI water;
forming a layer of said anhydrous organic liquid upon contact of said surface of said DI water by said anhydrous organic vapor; and
drawing said structure out of said DI water through said layer of said anhydrous organic liquid substantially all of said structure contacting said layer of said anhydrous organic liquid.

23. The method as defined in Claim 22, wherein said anhydrous organic vapor is conveyed to said vessel in an inert gas carrier.

24. The method as defined in Claim 23, wherein said inert gas carrier is selected from the group consisting of nitrogen, the noble gases, methane, and ethane.

25. The method as defined in Claim 22, wherein said chemical reaction wet etch upon said structure comprises a process selected from a group including rinsing said structure in an aqueous HF solution.